



Rick Hance Engineering Note

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Project: Dzero General Support
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Subject: EED/Dzero Electrical Operations Sub-Group - Organization and Responsibilities

This note describes the organization and responsibilities of the EED/Dzero Electrical Operations Sub-Group of the EED Infrastructure Group.

Overview

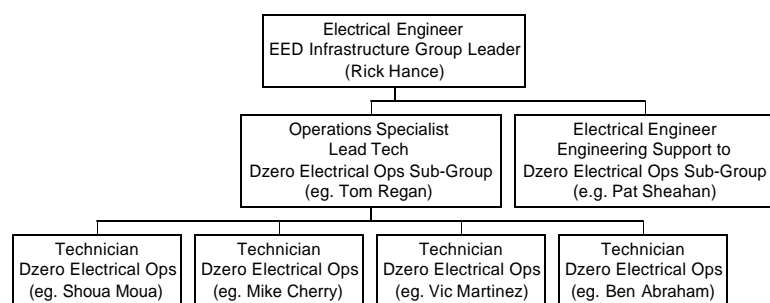
The EED/Dzero Electrical Operations Sub-Group is responsible for the maintenance and adiabatic improvement of the Electronics and Electrical infrastructures of the Dzero experiment. This sub-group is present at Dzero during normal working hours and is available for after-hour and weekend call-ins as necessary. The sub-group maintains the counting house and detector equipment rack utilities, rack protection systems, high voltage DC systems, 1553 local area networks, low voltage power supplies, solenoid and toroid magnet systems, the premises AC distribution system; and miscellaneous systems (Paging, FIRUS, smoke detection, leak detection, etc). They also assist the detector groups as appropriate with infrastructure issues such as sub-racks and cables. With the exception of "Dzero specific" low voltage power supplies, they do not normally troubleshoot or repair proprietary electronics apparatus developed by the detector groups such as calorimeter, muon, silicon, and fiber readout electronics. These proprietary systems remain the responsibility of the detector groups. However, some members of the Operations Group that were members of the detector group's electronics R&D teams may have residual responsibilities involving those systems and will maintain specialized test stands as necessary.

The sub-group is staffed by the Particle Physics Division Electrical Engineering Department (PPD/EED). PPD/EED provides administrative support¹ to the sub-group. The sub-group primarily provides "services" to the Dzero Experiment which in turn provides logistical support². The sub-group's tasks and priorities are set by the Dzero Run Coordinator.

The organization, job descriptions, and responsibilities of the Sub-Group are described below:

Organization

EED/Dzero Electrical Operations Sub-Group



Individual Job Descriptions

(1) Electrical Engineer - Engineering Support - Reports to EED Infrastructure Group Leader and cooperates as with the Operations Specialist. This Engineer also has duties in the main Infrastructure Group; but has a primary responsibility to provide engineering expertise to the Dzero Operations sub-group as necessary. Investigates and solves quality and reliability issues within the Dzero electrical/electronic infrastructure. Attends Dzero meetings and/or coordinates with the Operations Specialist and Dzero management as necessary to identify such issues. Initiates and documents adiabatic improvements to

¹ Administrative support includes staffing, payroll, salary adjustments, vacation tracking, personnel reviews, education, personal computers, and personal tools.

² Logistical support includes office and working space, experiment specific test equipment, tools, and supplies.

the electrical/electronic infrastructure as necessary. Responds to requests from the Operations Specialist for engineering assistance.

(1) Operations Specialist - Reports to EED Infrastructure Group Leader. Provides Lead Technician functions to the Operations sub-group including directly responding to infrastructure equipment failures as necessary, coordinating with Dzero Operations Chief and Shift Captains; planning, scheduling, supervising, and assisting with work; overseeing Technician work areas, procuring materials, maintaining spares and test equipment inventories, and administering, supervising, and mentoring subordinates. Sets work standards, maintains the document library, and trains Technicians.

(4) Technicians - Reports to Operations Specialist. Performs expert electronics and electro-mechanical infrastructure maintenance. Each Tech is cross trained in all responsibilities listed below except for Dzero "Premises AC Distribution Systems". The premises AC distribution systems require special skills and procedures and all such work will be coordinated by an AC distribution expert from the main EED Infrastructure Group.

Responsibilities:

- Equipment rack utility systems - This responsibility includes planning, procurement, installation, maintenance, and documentation of the utilities installed in the 100+ equipment racks located throughout Dzero in the fixed and moving counting house and the detector platform and trusses. These utilities include AC distribution boxes and power strips, blowers, air/water heat exchangers, water solenoid valves, doors, and panels.
- Rack protection systems - This responsibility includes planning, procurement, installation, maintenance, and documentation of the rack protection systems installed in the 100+ equipment racks located throughout Dzero in the fixed and moving counting house and detector platform and trusses. These systems include Rack Monitor Interfaces (RMI's), smoke detectors, leak detectors, water flow detectors, air flow detectors, and FIRUS connections.
- High voltage DC systems - This responsibility includes planning, procurement, installation and maintenance of the more than 1500 primary channels of standard Dzero VMEbus based high voltage (HV) distribution systems. These systems include 12+ equipment racks and associated VME sub-racks, backplanes, low voltage power supplies, wiring harnesses; VME HV motherboard modules, and HV generating pods.
- 1553 Control system - This responsibility includes planning, procurement, installation, maintenance, and documentation of the 100+ installations of Mil std 1553 control system devices comprising the Dzero control system. This includes Rack Monitors (RMs), VMEbus sub-racks, VMEbus network controller modules, and the cabling network. This DOES NOT include the various detector readout modules that incorporate 1553 interfaces for programming and monitoring. These modules are the responsibility of the various detector groups. However, the group will assist as necessary with systems issues (network troubleshooting, cables and VMEbus controller modules) relating to these modules.
- Low voltage power supplies - This responsibility includes planning, procurement, installation, and maintenance of the 200+ low voltage power supplies developed for use in the calorimeter preamp, calorimeter BLS, calorimeter readout, muon PDT, muon MDT, muon readout systems, central tracking readout systems, etc. This does NOT include proprietary systems, such as the trigger framework, that were developed elsewhere and brought to Fermilab. Those devices are the responsibility of the detector groups.
- Solenoid and toroid magnet energization systems - This responsibility includes maintenance and documentation of the electrical systems of the solenoid and toroid. It includes the 480V, 150 and 500kW power supplies, reversing switches, dump switch, filters, controls, and interlocks.
- Miscellaneous systems - This responsibility includes planning, procurement, installation, maintenance, and documentation of various auxiliary electronic systems such as the paging system, status display panel system, high sensitivity smoke detector system (HSSD), fire & utilities (FIRUS) system, underfloor leak detector system (turtles), etc. Some of these systems are directly maintained, and others are maintained by outside groups coordinated by the Operations Group as necessary.
- Premises AC Distribution Systems - The AC distribution system will be relatively stable once Run IIa is in progress. Further improvements and modifications to the system will be coordinated by EED Infrastructure Group experts on a task by task basis as requested by the Operations Specialist and the Electrical Engineer. The Operations Specialist would however, within his capabilities, assume the responsibilities of day to day operation of the electrical infrastructure i.e. preparation for and recovery from power outages, miscellaneous system maintenance, temporary lighting, etc. The EED Infrastructure Group will be engaged for planning, procurement, installation, maintenance, and documentation of all Dzero 120/208/480V single and three phase AC distribution equipment. This includes both the utility and the standby power distribution systems consisting of switchgear, generator, transformers, distribution panels, disconnects, branch circuits, outlets, lighting, etc. The Infrastructure Group will interface with Facility Engineering Site Services (FESS) as necessary as well as supervising contract and T&M (time and materials) electricians. The Infrastructure Group will also prepare and oversee an annual budget for electrical work at Dzero as necessary.